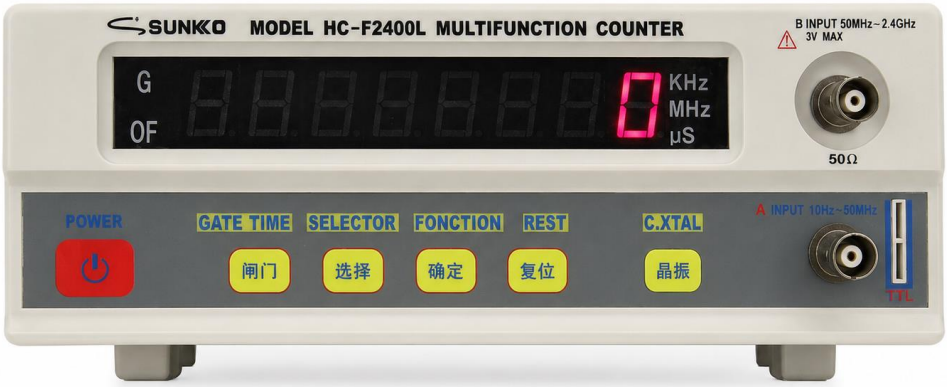
Multifunction Counter Manual



Chapter I. Overview and Technical Conditions

1. Overview

This instrument is a multifunction intelligent counter for 10 Hz to 2400 MHz.
Features: Crystal oscillator; highlighted LED display with eight digits; low power consumption; compact and lightweight design; high testing accuracy and input signal checking.
Main functions: frequency measurement, accumulation, and crystal testing.
All functions are performed by an integrated all-in-one computer circuit. The instrument includes switches, indicators, a front panel, a rear panel, and the accessories listed in this manual. Before using this instrument, read and understand the information and details below to ensure correct operation and the best results.

2. Technical Conditions

I. Testing

Item	Specification	Input
Frequency range - Grade 2 position	10 Hz - 1 MHz direct counting	Pass A
Frequency range - Grade 1 position	200 kHz - 100 MHz proportional counting	Pass A
Frequency range - Grade 0 position	30 MHz - 2400 MHz proportional counting	Pass B
Resolution - Grade 2 position	0.1 Hz, 1 Hz, or 10 Hz optional	
Resolution - Grade 1 position	1 Hz, 10 Hz, or 100 Hz optional	
Resolution - Grade 0 position	10 Hz, 100 Hz, or 1000 Hz optional	
Gate time	0.1 s, 1 s, or 10 s optional	
Accuracy	1 count value + standard time error x frequency	
Accumulation testing - Grade 3 position	10 Hz - 1 MHz direct counting	Pass A
Accumulation testing resolution	+/- 1 input count value	
Crystal testing - Grade 4 position	2 MHz - 20 MHz	Pass C

II. Input Features

Input	Specification
Pass A	Input sensitivity: 25 mVrms Impedance: about 1 Mohm (less than 35 pF) Maximum safe voltage: 30 V
Pass B	Input sensitivity: 30 mVrms Impedance: about 75 ohm Maximum safe voltage: 3 V

III. Time Base

- Short-time stability: +/- 3 x 10^-9 per second
- Long-time stability: +/- 2 x 10^-5 per second
- Temperature coefficient: +/- 1 x 10^-5, 0°C to 40°C
- Line voltage change of 10%: +/- 1 x 10^-7

IV. Normal Conditions

- Display: red 8-digit LED display with kHz, MHz, crystal testing, Pass B input, and counting display indicators.
- Check: count with 10 MHz time-base oscillator frequency.
- Power supply requirements: AC 220 V +/- 10%, 50 Hz.
- Start time: 20 minutes under 25°C.
- Operating temperature: 5°C to 50°C.
- Storage and transportation temperature: -40°C to 60°C.
- Operating humidity: 10% to 90% RH; storage humidity: 5% to 95%.
- Size: width 198 mm, height 70 mm, length 175 mm; weight 1 kg.

Chapter II. Operation

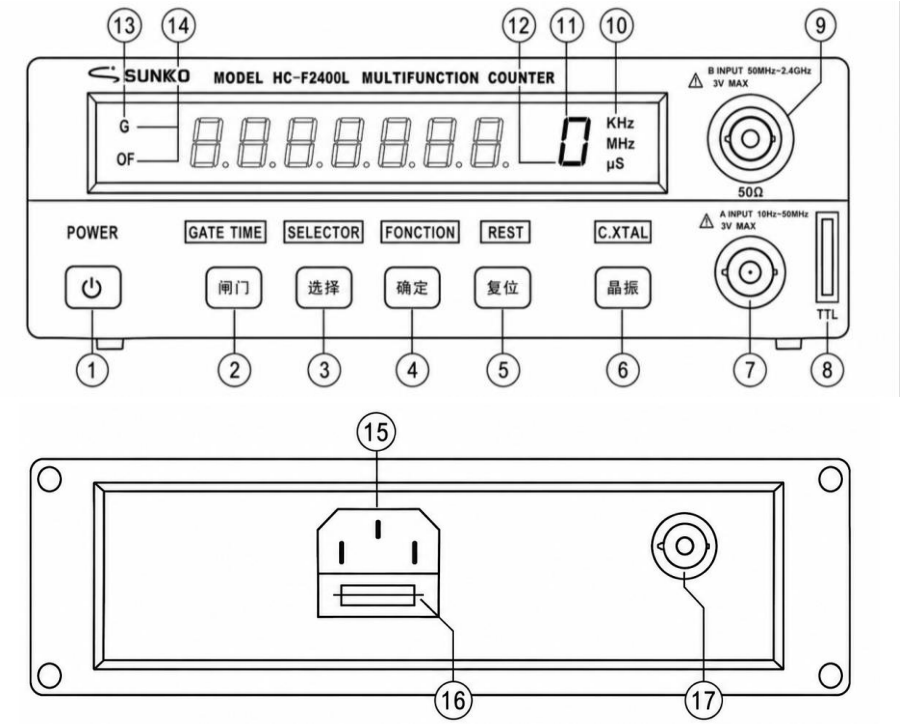
I. Introduction

This chapter provides the overall operation procedure for the multifunction counter, including control, connection, display, operation training, and user maintenance of the front panel.

II. Before Use

1. Power supply requirements: AC 220 V +/- 10%, 50 Hz single phase. Maximum power consumption: 5 W.
2. Preheat for 20 minutes before testing to ensure frequency stability of the crystal oscillator.

III. Front / Rear Panel Features



1. Power switch: press the button to power on or power off.
2. Gate selector: selects different resolutions and resets the counter during frequency testing.
3. Grade selector: selects the range and counter testing mode during frequency testing.
    - Grade 0 position: >= 30 MHz, 30 MHz - 2400 MHz; range selection; G and MHz indication light on. For Type B frequency counter, this grade is used for testing; display 1000.000 kHz.
    - Grade 1 position: 200 kHz - 100 MHz (Type B: 160 MHz); range selection; MHz indication light on.
    - Grade 2 position: 10 Hz - 1 MHz; range selection; kHz indication light on.
    - Grade 3 position: count testing; OF indication light on.
    - Grade 4 position: crystal testing selection; uS indication light on.
4. Function: after selecting the grade and gate, press this button to enter the testing status.
5. Reset: press this button to stop testing and keep the previous data available for reading.
6. Crystal oscillator: select the crystal oscillator testing function.
7. A INPUT: Pass A input terminal.
8. Pass C input terminal: crystal testing input terminal.
9. B INPUT: Pass B input terminal. Type B frequency counter has no such input terminal.
10. kHz frequency and gate status indicator light: also shows that the selected grade is Grade 2.
11. MHz frequency and gate status indicator light: if the G indicator is off, it shows that the selected grade is Grade 1.
12. uS crystal testing indicator light: also shows that the selected grade is Grade 4 and that the crystal testing probe is active.
13. G Pass B: frequency testing indicator light; also shows that the selected grade is Grade 3, counter testing grade.
14. OF: Pass A count testing indicator light; also shows that the selected grade is Grade 3, counter testing grade.
15. Power socket: 220 V, 50 Hz.
16. Safe tube stand: 1 A.
17. Signal output.

Each time the gate switch or grade selector is pressed, the instrument shows the indication for 4 seconds on the display. Example: [1ch 0.1] shows Grade 1 position and 0.1-second gate; [3ch 10] shows Grade 3 position and 10-second gate.

IV. Applications

1. Plug in the 220 V AC power socket. When the power status indicator lights, the instrument is powered normally. Press the power switch, connect the attached cable to the signal input socket on the panel, select the proper grade and gate time, and test the signal frequency. If the gate is short, the test speed is fast but the resolution is low. If the gate time is long, the frequency testing speed is slow but the resolution is high.
2. Example for testing the frequency of modern communication tools: Example 1: to test an analog mobile phone sending frequency, set the frequency counter to Grade 0 [0ch-0.1], fix the red clamp to the mobile phone antenna, use the mobile phone, and turn on the phone input. Once the phone is connected, the counter displays the sending frequency. Example 2: to test a 30 MHz two-way radio frequency, set the frequency counter to Grade 1 [1ch-0.1], press the two-way radio sending key, and gradually move closer to the counter until the normal frequency display appears. If the signals are too close, the counter may not operate normally due to overly strong signals. Example 3: to test the frequency of a pager, split phone with a movable handset, or two-way radio, set the frequency counter to Grade 1 [1ch-0.1], take one 5 pF capacitor, connect one wire to the middle of the attached cable fixture and the other wire as the exploring pin, and directly touch the frequency test point to obtain the frequency value.
3. Crystal oscillator testing function: insert the crystal oscillator into the corresponding socket, select the crystal oscillator testing function, and press the confirmation button to test the oscillator frequency.
4. After testing, unplug the power plug.

V. Notes

1. When testing high-voltage, strong-radiation signal frequency, use a series connection with a large resistor when wired. For wireless testing, keep the counter far away from the signal source. After signal attenuation, handle the test to avoid damage to the instrument.
2. When testing signals above 100 MHz, keep the test cable as short as possible.
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